

HYPERACTIVE? I'll say. This has been a very interesting month, with activities piling up one atop another. The last issue was sent out a little early to avoid a rush at the printer's, what with everyone trying to get mailings out prior to the postage increase. Then I received an invitation to attend a conference in Chicago with AstroVision and their sales personnel (report below). After that we had the West Coast Computer Faire to get ready for (report below) and then this issue to prepare. So there were a lot of things happening, and here are the stories.

REVIEW OF PRODUCTS BY ASTROVISION. Four of us attended a meeting in Chicago on March 20. Fred Cornett, George Moses, Mike Peace and myself represented the thousands of users of the Bally Arcade at a sales meeting. About 35 distributor organization personnel were there to get the low-down on near term and far future plans. The schedule first:

May 15	Release of the Arcade plus
Aug 1	Release of the AstroVision Basic
Oct 1	Release of the Add Under
198?	Release of a Z8000 Arcade unit

A. The ARCADE PLUS is our familiar Bally friend with a new motherboard. Functions are the same but some parts have been rearranged to alleviate the heat problem and therefore make the unit more reliable. As a result, the shields have been modified and the whole thing under the cover looks different. The reason for the "PLUS" marking is the fact that the AstroVision Basic will be included without additional cost. (The cost of a two-handle unit is still 300.) ((But Montgomery Ward sales will not include the Basic.))

B. The new BASIC cartridge is virtually complete, and only needs the final go-ahead to be placed into production. I mentioned this cartridge on page 40, and I had the opportunity to review one a couple of days before the meeting. It does transfer data at 1800 baud, six times faster than the current unit. It includes an EDIT function, whereby you can recall a line number and make a correction to the commands located there. A special command function allows you to step through the individual letters/numbers in the line. Another feature is a TRACE mode - if a program is running, by pressing LIST, the next line to be executed will show up on the screen and then the computer will perform the operation, then the next line, the next operation, etc., so that in the case of program debugging, you can see if the program is doing what you expect it to (it always does what you tell it to, but that may not be what you expect).

Many of the commands having to do with the sound generating system have been revised from a "&(21)=n" mode to a "NA=n" mode, saving 3 bytes each.

The cassette interface has been moved to the BASIC cartridge itself. There is a single jack at the top of the cartridge for a single cable to the recorder. You have to switch the cable at the recorder between the input and output jacks.

All of this has to be paid for in some way. The \$ mathematical system is gone; the :INPUT n system for program identification is gone; the screen scrolling during tape loading is gone; probably others.

The 1800 baud system is not at all compatible with the old 300 baud system. Not to worry. As a result of every reviewer's comments, a 'hook' was left in the system to allow the new Basic to open hand controller port three so that the old tapes can be loaded into the memory. Then the program can be outloaded onto a new tape at the 1800 baud rate. It does mean that those of you planning to sell your software to "new" people will have to convert your tapes for them, because they won't have the old cassette interface. The new Basic will list at \$55.

.. Tom Wood is finishing up the job of disassembling the new Basic, and we will be able to announce what we will have discovered in the next issue, and also let you know about copies for your own use.

WEST COAST COMPUTER FAIRE took place April 3-5, and neighborhood ARCADE owners found Dick Houser and myself manning the booth at spot 09. We also had help from Tom Wood and Andy Armstrong as Dick and I would make occasional excursions to see what was interesting. At the end of the period, we found that 85 people had signed the visitor's book. We had one Arcade unit running almost full time with Galactic Invasion, plus another one to show off different programs made up by our subscribers. We also had the Blue Ram there with its keyboard and the BSR controller. The latest innovation from Perkins Engineering was also on display, the Bally motherboard with 39 extra IC chips to allow High Resolution color displays. Another prototype piece of hardware was the VIPER 16K memory expansion board. So there were plenty of things to show Dan Dawson, President of AstroVision, when he and vice-President-Marketing Ray George visited the booth. Another welcome visitor was Tim Hays, chief programmer at Sebree's, whose booth was really moving the Atari material.

We could have sold a lot of hardware if we had any. "Galactic Invasion" was a big hit with all - there was always a crowd around the TV when we kept the game in operation. The fine figures, sound, and animation were appreciated especially by those visitors whose own game programs had little more than boxes to be manipulated. There were quite a lot of questions about "Are they still making the Arcade?" "Where can I get the games?"

I appreciated the opportunity to chat with other magazine publishers - Wayne Green of KILOBAUD/MICROCOMPUTING who is coming out with a non-computer's computing magazine in the near future - Dave Ahl of CREATIVE COMPUTING who's March issue had a Bally history article, and who's comments were most interesting - and dapper John Craig of INFOWORLD who had a most attractive young lady on his arm and was busy with plans for his Computer Fair/Flea Market in San Jose, April 25.

EXTENDED BASIC We have in hand a tape that contains the Extended Basic language (in 8K). This tape will be used to generate both tape and rom versions, to be compatible with VIPER and BLUE RAM memory additions, as well as being usable in the basic machine as well. You will be notified when these are available.

Found in the mouldy pages of an ancient copy of Captain Billy's WhizBang:

May the Artesians keep a head on your beer!

SOFTWARE IS THE GAME I was quite interested to see that the distributor group recognized the value of software to the sell-ability of the Arcade game. Since each Arcade will come with the Basic, each and every purchaser is a potential customer for your software. Once the novelty of the included games wears off, they will try the Basic, and possibly get 'hooked'. This paragraph is directed towards the subscriber who has not yet acted seriously on the idea of producing a program that can be marketed. If you have an idea for programs that you think have some potential, drop me a line. All kinds of programs are needed - just pop into a computer store or read the ads in Kilobaud or Creative Computing to see what's on sale. Write something similar in AstroVision Basic. Sell it...

PROGRAMMING CONTEST Authorship Manual is still in work, reports Dick Ainsworth, its author. Dick is hard at work on the new AstroVision Basic Manual, one which will be considerably more comprehensive than the last one, he assured us.

The software workers are also working on such programs as "Peckman", "Gorf", and "Wizard of War". These full-size game names will change as the units are released.

ALTERNATIVE ENGINEERING CORP. sent a production sample of their VIPER 16K RAM card to be displayed at the Faire. (see ad p. 69) It consists of 16 integrated circuits, a 10MHz clock chip, and two sets of DIP switches on a 4x6 plug-in card. The workmanship is excellent, and so is the parts quality. Most of the IC's are LS type. This board (and system) is compatible with the Blue Ram software.

PERKINS HI-RES BOARD was also received just in time for the show. This board is the standard Bally motherboard with a number of ICs added, most by piggy-back technique onto existing chips. Many extra connections are made to make the item 'work'. When powered up, the picture we normally see filling the screen was reduced to one-fourth the size, and occupied the upper left quadrant of the screen. There were a number of big eyes at the Faire when they saw the tiny type, still 5x7, but so much smaller.

A New Item From Perkins Engineering:

WE ARE PLEASED TO ANNOUNCE ANOTHER ENGINEERING BREAKTHROUGH - HIGH RESOLUTION GRAPHICS. THE "HI-REZ ADD-IN" FROM PERKINS ENGINEERING USES 39 ADDITIONAL CHIPS TO EXPLOIT THE HIGH RESOLUTION CAPABILITY OF THE BALLY CUSTOM CHIPS. THE NEW CHIPS ARE ADDED TO THE BALLY MOTHERBOARD IN A WAY WHICH ALLOWS THE REGULAR CASE TO GO BACK ON. A PROTOTYPE MODIFIED BOARD WAS DEMONSTRATED AT THE COMPUTER FAIRE. HERE'S WHAT YOU WILL GET: RESOLUTION MODE IS SOFTWARE SELECTABLE AT LOW NORMAL FOR EXISTING PROGRAMS, MEDIUM (160X204, SIMILAR TO MATTEL), AND HIGH (320X204, BETTER THAN APPLE). THE 39 CHIPS INCLUDE AN EPROM FOR FIRMWARE SUPPORT OF THE NEW MODES AND 12K OF ADDITIONAL MEMORY. THE SOFTWARE MODE SELECTION ALLOWS THE INDIVIDUAL PROGRAM TO CHOOSE ITS OWN RESOLUTION FOR FULL COMPATIBILITY WITH EXISTING GAME CARTRIDGES AND BALLY BASIC. FOR BLUE RAM OWNERS, A TAPE WILL BE INCLUDED TO PROVIDE MEDIUM RESOLUTION BASIC WITH FOUR SCREEN COLORS AND 7K PROGRAMMING AREA. PRICES WILL BE IN THE RANGE OF \$250 FOR THE KIT AND \$300 WIRED (YOU SEND IN YOUR BALLY FOR MODIFICATION). AVAILABILITY WILL BE ANNOUNCED IN THE NEXT ISSUE.

CORRECTION to ALCHEMISYMMETRICAL ART (p.39) change line 30:
 IF M > 1 BC = 4 and FC = RND(32)x8+(2xC)+4

Michigan Bally Users' Group gets a look at Zgrass-32 "add-under" for the Arcade!

by George Moses and Brett Bilbrey

For about a month we had been sending out letters to members of the Michigan B.U.G. and interested parties in neighboring states that it was time for another users' group meeting. The last one had been in October and Astrovision had sent two representatives to answer questions about their takeover of Bally's Consumer Division and to show off some of their forthcoming game cartridges. You read all about it and saw the photos in the November issue of Arcadian. For this meeting, scheduled for February 8, Dave Nutting Associates, designers of the Bally Arcade and the new Zgrass-32 had promised to send a representative out from Chicago with their amazing new computer.

News like this brings all the Bally Arcade owners out of the woodwork! The phone rang steadily for two weeks before the meeting. People had new hope. Some had purchased other computers as they tired of waiting for Bally to keep their promise to expand the Arcade. But these were the people who were most excited about this meeting! And they promised to come by the carload.

Saturday morning, February 7, the day before the meeting we went to Detroit Metro Airport and picked up Craig Anderson from Minnesota and Steve Wilson from Ohio. They came the farthest to attend. At 6 pm that evening the George Moses household was abuzz with a crowd of friends showing off software. Craig Anderson, Brett Bilbrey and Steve Wilson were doing some unimaginable things to the Arcade on George's dining room table when the doorbell rang. It was Scot Norris from Dave Nutting Associates with his wife, Cheryl looking a bit tired after a 6 hour drive. We opened the hatchback of his car and there among the luggage was the Zgrass-32. Tired or not Scot couldn't wait to plug it in and give us a little demonstration of Zgrass before dinner. He had only had a week of working with this computer prior to the meeting and wasn't fully versed in the new Zgrass language yet, but Scot was able to show us some amazing graphics on our TV screen.

Scot showed us how macros work and demonstrated the hierarchy of the Zgrass language. A macro is a program or subroutine that can run concurrently with other subroutines. The Zgrass-32 can run 127 macros at once. This is called "multi-tasking". You can call any macro, all 127 macros at once, or macros can be programmed to call each other. When you get the program running the way you want it to you can tell the computer to compile it. That is, it will rewrite the program in machine language, thus eliminating the need for the computer to interpret each command before executing it. This results in an amazing increase in speed of operation. He then demonstrated the way the Zgrass-32 can display 4 colors at once with a concentric box routine that when compiled gave a color show that had a tendency to leave one breathless. With this computer you have more screen area as no area is needed at the bottom for scratchpad. You have 102 pixels of vertical display and 160 pixels horizontally with 2 bits assigned per pixel for memory. This is the same as Bally Basic resolution except that the full 4K of memory is used for dynamic screen RAM. The entire ROM inside the Arcade is ignored and the Zgrass-32 uses its own scratchpad RAM within the keyboard so you don't need to borrow any screen RAM. Scot showed how interrupts could be used for updating graphics for smooth animation. Brett Bilbrey recently showed us this is possible with the present Arcade using machine language programming techniques he and Dave Ibach pioneered, but with this new computer it's so easy it's a snap!

Speaking of SNAP, that's the name of a new command you get with the Zgrass-32. Here you can snap an area of the screen display and store it in memory and display that image wherever and whenever you call it. You can write 6 macros that store 6 pictures of a gunfighter walking, for instance. Using multi-tasking you could display them in sequence for the visual display of an animated figure. You can also tie any figure or SNAPPED image to the hand control and make it move at your command.

The self help routine was demonstrated. If you're not sure about the format of a command you just type in the name of the command and the word "HELP" and the computer will ask you for the parameters required so you don't have to grab the instruction manual each time you begin to use an unfamiliar command. The production line prototype Zgrass units hadn't been built yet, so what we saw was still in the lab-development state. The finished prototype will have BOX, LINE, CIRCLE and POINT commands. Not many computers can draw graphics as fast or as easily as the already existing Bally Arcade. And the Zgrass-32 puts it far ahead of the rest.

The cassette tape interface is built into the computer and runs at 2000 baud. It differs from the interface we have now in that it is not a wave scanner. All it looks for is sound wave peaks and could care less what shape they're in. So it's a bit more forgiving than what we've had to tolerate in the past. The interface seemed to write more reliably to tape when the jack was plugged into the auxiliary plug than when using the mike plug.

Two RS232 ports will communicate with disc drives and printers. One thing we'd like to see is a parallel printer port that would handle a standard Centronics printer. The more expandability it has the more saleable the computer will be. The character set needs some refinement from what we saw and comments we heard at the meeting. The 3x5 pixel characters in low resolution provide 40 characters by 24 lines. Most people remarked that they would like to see higher resolution. As we remarked earlier, this was a lab-development model. More bells and whistles will be added by the time the assembly line gets cranked up. E.F. Johnson, the electronics firm in Garner Iowa is said to be gearing up for prototype production.

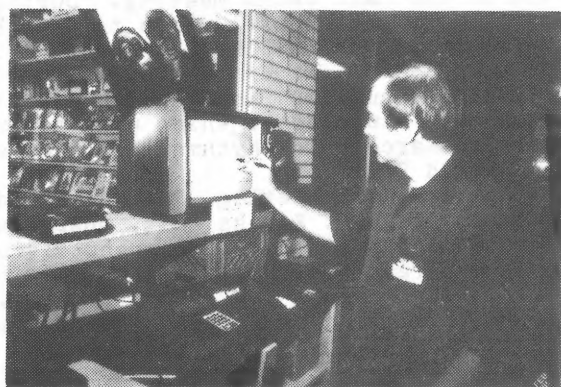


The advantages of Zgrass, a graphics language, is that the graphics handling is done by a language that was created for just that purpose. Commands for screen manipulation have been tied in with screen interrupts and display techniques so they're executed much faster and more efficiently than any TRS-80, Apple or Atari could ever hope to do. The add-on will access the custom chips in the Bally Arcade, which will facilitate moving graphics commands thru the Z80 microprocessor. Just as the Bally originally was accessible to "hacking" once we figured everything out, it looks like the Zgrass-32 will have the same ability with as many expansion peripherals attachable as possible. For instance, a parallel port, a serial port, expansion port, disc connector, and dual cassette controllers. The same foresight appears in this design that was in the Arcade's 50 pin expansion connector.

We also got a look at the science math package, a software feature that's built-in and is not common in any other computer, featuring 13 digit accuracy. Scot demonstrated the sine and cosine features and drew several concentric circles for us. The Screen Editor allows you to use the joystick to move the cursor anywhere on the screen and use the knob and trigger to insert spaces or remove characters. You can do the same thing with the keyboard using left-right and up-down arrows and you can type in corrections directly over the errors. With many computers you have to go looking for a program using addresses to find macros or information off a disc. You have to direct the flow. But the Zgrass-32 maintains all internal control to save any macros or variables on tape or disc for you in one clean sweep. In other words, it does all your housecleaning for you. The computer already has the software built in to handle multiple program storage and variable allocation with just a simple command.

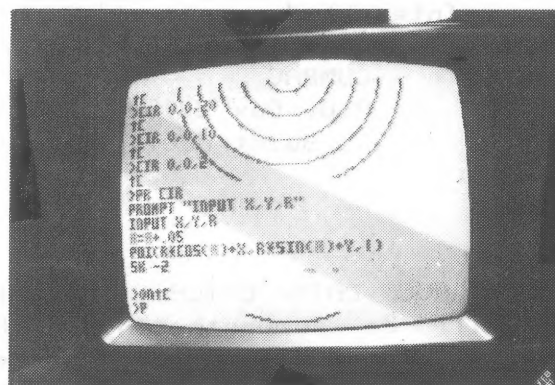
Zgrass in no way resembles Basic. It uses no line numbers. It's easy to learn. And it will write better programs for the person who wants to see the program come alive visually rather than just print text. Basic was written to teach programming to computer students. Zgrass was developed from the start to do computer graphics. You get it as standard equipment in the Zgrass-32 for only \$599.00, plus the price of your Bally Arcade that must rest on top of it (\$299.00). Everybody was amazed at what it would do for its total cost of \$898.00 (both modules together). When you compare this machine with its 32K RAM and 24K ROM with a 16K Apple II Plus that runs \$1195.00, it seems like a bargain. As the software appears on the market to make the Zgrass-32 do the things it was designed for, our impression is that it'll be an item in high demand at your local computer store.

CRAIG ANDERSON demonstrates the lite pen he researched and built. It works amazingly well, and Brett Bilbrey wrote some software to boot the Arcade into a high speed mode to read the data as fast as the lite pen can supply it.



THEY'RE HIGH ON ZGRASS — Kim Moses, George Moses (her dad), Brett Bilbrey, the Zgrass-32 Computer, Scot Norris, Dave Ibach and Craig Anderson.

THE SUPPORT given the Michigan B.U.G. by Ron Pollock of Tri-County Electronics in Fenton, Michigan is evidenced here. He opens the entire mall corridor and lines both walls with multi-level counters, supplies dozen of color TVs, power cords and keeps a large stock of Arcades and accessories handy for everybody.



THE CIRCLE drawing function is shown here. Also notice the self help "PROM PT" function of the Zgrass-32. You can see some of the 3 x 5 character set displayed in this photo.

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The Central and Upper Midwest Bally/AstroVision Club (CUMBAC), formed in anticipation of the "comeback" of the Bally system, is now conducting a membership drive. We've located the regional AstroVision rep and are contacting dealers as they come on the line. We've got a core group based on two years of mailing lists and correspondence, and are publishing a newsletter shortly which will be distributed by mail and in the stores (dealers) to users in Minnesota, Wisconsin, Iowa, North and South Dakota. We'll be holding an "Astrofair" in May - details to follow. Interested users please write us at:

CUMBAC
P.O. Box 21151
Saint Paul, Minn.

55121

- SIG BALLY -

Many thanks to Jay Fenton who made our February meeting a memorable one.

Jay met with our group before lecturing at the main CACHE meeting. During our meeting he showed us a video tape on Bally BASIC and a 7K TERSE keyboard unit. The TERSE unit was one of the several prototype add-on units. He also demonstrated three new videocades, which will be available in March; Bio-rhythms, Music Maker, and Grand Prix.

At the main meeting, Jay ran a video tape on the UV-1 Zgrass unit, shared a few of his favorite programs and discussed the Zgrass programming language. He also brought along his latest project, GORF. GORF is a commercial video arcade game in which the player tries to get through a five-episode space adventure. It also incorporates a speech synthesizer.

I've heard several interesting things about the Zgrass 32 unit. The Zgrass disk system will be compatible with the TRS-80. The 32K RAM addition is intended so that the user can run CP/M and bypass the resident ROM. Therefore, the 280 will be addressing a full 64K RAM; the new add-on will have a built-in assembler.

USER GROUP DATA/ CHICAGO Latest word is that Rusty Blommaert and Larry Smith will be demonstrating their keyboard and memory add-on at the National Computer Congress, to be held at Mc Cormick Place, Chicago, May 4-7. They will be a part of the CACHE group exhibit.

ARCADIAN

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1 .MIKE PEACE PRESENTS
2 .WAVEMAKERS MEMORY          D00DLE
10 :RETURN ;FC=RND (32)*8;BC=RND (32)*8-1;CLEAR ;*(9)=255
20 A=0;B=0;PRINT ;CX=-45;NT=0;PRINT "MEMORY D00DLE
100 FOR X=49TO 56;NT=X-40;MU=X;NEXT X;FOR Z=1TO 675
110 IF *(16)A=A+JX(1)*2;B=B+JY(1)*2;GOTO 120
115 GOTO 110
120 C=(A+80)*2;*(Z)=C*100+B+44
130 BOX A,B,2,2,3;IF TR(1)GOTO 150
140 NEXT Z
150 FOR X=75TO 60STEP -2;NT=76-X;MU=X;NEXT X;CLEAR ;:RETURN
155 FOR X=1TO Z;IF TR(1)RUN
160 A=*(X)*100*2-80;B=RM-44
170 BOX A,B,2,2,3
180 NEXT X;GOTO 155
190 FOR X=1TO 900;NEXT X;GOTO 155

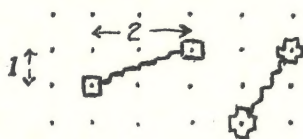
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ARCADIAN PROGRAM REWARD We are going to provide an on-going stipend to the author of the 'best program' in each issue of the ARCADIAN. I will send a tape of each issue to a group of five judges who will make some decision as to which of those programs they feel is the 'best', and the selected author will receive \$100, courtesy of AstroVision. The author will replace one of the judges on the panel, allowing for rotation of that job. The full scheme has yet to be ironed out, and some changes may take place before we actually start, but I wanted to pass this word to you so that you could think of some programs to submit. The first programs to be reviewed under this scheme will be in issue Eight.

PROGRAM POLICY This is a reiteration of a statement made some time ago. Programs sent to me for inclusion in the newsletter are not paid for, and are assumed to be usable by all. The monthly payment scheme mentioned above will hopefully increase the volume of programs submitted. If so, we will increase the size of the publication to suit. But we always need short and simple programs that can be used by beginners to help them understand computers and the Arcade.

Computer TWIXT is based on the 3M game. The player with the square has to generate a line from one side of the playing square to the other, while the player with the cross has to work vertically. The computer will draw a line for you if your new piece is at a certain location from an existing piece. The two-over-and-one-across requirement is illustrated (the 2:1 can be in any direction, or 1:2):

The computer will tell you if your wall extends across the playing square. Use TR(1) to start a new game.



ARCADIAN

```

1 .
2 .
3 .
5 .COMPUTER TWIXT
6 .BY JOE PIPEK 8-80
10 @(1)=2;@(2)=1;@(3)=-1;@(4)=-2;@(5)=-2;@(6)=-1;@(7)=1;@(8)=2
20 @(11)=1;@(12)=2;@(13)=2;@(14)=1;@(15)=-1;@(16)=-2;@(17)=-2;@(18)=-1
30 @(22)=1;@(23)=1;@(24)=2;@(25)=3;@(26)=3;@(27)=3;@(28)=4;@(29)=5;@(30)=5
40 U=39;CLEAR ;FOR Y=-UTO USTEP 6;FOR X=-UTO USTEP 6;BOX X,Y,1,1,1;NEXT X;NEXT
Y
80 BOX U,U,1,1,3;BOX U,-U,1,1,3;BOX -U,U,1,1,3;BOX -U,-U,1,1,3
90 CY=22;CX=-68;TV=49;A=-52;B=22;GOSUB 500;CX=52;TV=50;A=68;GOSUB 400
110 CY=30;CX=-64;TV=95;CX=-57;TV=97;CY=18;CX=62;TV=96;CY=25;CX=62;TV=94
130 D=0;A=3;B=3;W=0
140 D=(D=1)+1
150 CY=0;CX=-68+(D=2)*120;TV="↑";CX=-68+(D=1)*120;TV=" "
170 A=6bJX(D)+A;B=6bJY(D)+B;IF A<-33A=-39b(D=1)-33b(D=2)
200 IF A>33A=39b(D=1)+33b(D=2)
210 IF B<-33B=-39b(D=2)-33b(D=1)
220 IF B>33B=39b(D=2)+33b(D=1)
230 BOX A,B,3,3,3;BOX A,B,3,3,3;IF TR(D)=1 IF PX(A,B)=1GOTO 260
250 GOTO 170
260 GOSUB 500-(D=2)*100;IF (ABS(A)=39)+(ABS(B)=39)W=1
280 IF W=1C=0;P=A;R=B;K=3;Q=3;H=1;GOSUB 1020
290 GOTO 140
400 BOX A,B,3,1,1;BOX A,B,1,3,3;GOSUB 600
460 RETURN
500 BOX A,B,3,3,3;GOSUB 600;RETURN
600 FOR E=1TO 8;X=A+@(E)*6;IF X<-39b(D=1)-33b(D=2)GOTO 690
630 IF X>39b(D=1)+33b(D=2)GOTO 690
640 Y=B+@(E+10)*6;IF Y<-39b(D=2)-33b(D=1)GOTO 690
660 IF Y>39b(D=2)+33b(D=1)GOTO 690
670 IF ABS(A)=39IF ABS(B)=39GOTO 690
680 IF PX(X,Y)≠1IF PX(X+1,Y+1)=PX(A+1,B+1)H=30;Q=0;GOSUB 810
690 NEXT E;RETURN
810 FOR S=22TO H;IF X-A=12P=S-20
830 IF X-A=-12P=20-S
840 IF X-A=6P=@(S)
850 IF X-A=-6P=-@(S)
860 IF Y-B=12R=S-20
870 IF Y-B=-12R=20-S
880 IF Y-B=6R=@(S)
890 IF Y-B=-6R=-@(S)
900 BOX A+P,B+R,1,1,3;IF Q=1IF S=HRETURN
910 IF Q=1NEXT S
920 IF PX(A+P,B+R)=0Q=1;H=S;GOTO 810
930 NEXT S;RETURN
1020 IF K+Q=0GOTO 1100
1025 FOR S=HTO H+7;M=S-8b(S>8);L=P+@(M);O=R+@(M+10)
1030 BOX L,0,1,1,3;BOX L,0,1,1,3
1070 IF PX(L,0)=1P=P+@(M)*6;R=R+@(M+10)*6;H=M-3b(M>3)+5b(M<4);GOTO 2000
1080 IF C=0IF S>7RETURN
1090 NEXT S;RETURN
1100 CX=(D=2)*48-(D=1)*79;PRINT "WINNER
1990 IF TR(1)GOTO 10
1995 GOTO 1990
2000 IF C=0Z=M+1
2010 IF Z>9RETURN

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VIPER (Video Image Processing Equipment Rack) SYSTEM

The System One contains one 16K RAM card, one bus interface card, one VIPER One cabinet (aluminum), one card rack, one +/- 5 volt and +12 volt power supply (fused), one VIPER to Bally 50-pin bus cable, one switched AC outlet, one on/off indicator switch.

The System Five contains 16K RAM card, VIPER system interface card, heavy duty +/- 5 volt and +12 volt system power supply (fuse protected), one VIPER Five cabinet, one VIPER to Bally 50-pin bus cable, one five-slot motherboard with gold plated connectors, three status indicator tri-color LEDs, one VIPER keyboard input, one 5-slot card rack with guides and fan mount (fan optional), one switched AC outlet, one on/off indicator switch.

System Ten contains the System Five plus one VIPER Ten cabinet, one extra five-slot motherboard with gold plated connectors, one extra five-slot card rack with guides and fan mount (fan optional), one extended 44-pin VIPER to VIPER bus cable, one on/off indicator LED.

The VIPER System keyboard is a 62-key unit that is ASCII-coded, upper and lower case letters, two user-defined keys, parallel to serial VIPER interface card (this interface card is adaptable to other keyboards), one aluminum cabinet, one coiled cable with DIN connector, one status indicator LED.

VIPER Interface card details: This card contains the following: eight I/O ports to control system operations, a 1K ROM monitor that is socketed to allow easy upgrading to a 4K ROM, a 12-2400 baud audio cassette interface with programmable speed selection, one keyboard input port for the VIPER keyboard, one memory management system to allow up to 128K bytes of RAM expansion, one independent 5-watt audio amplifier with volume control with 8 ohm speaker output and two pre-amp outputs, one audio dubbing-recording mode for mixing program tapes with voice, music, and sound effects, audio sampling/ and detecting in two frequency ranges for elaborate audio/visual synchronization. Also includes address, data, and control line buffers and bus inputs from computer expansion port.

VIPER RAM card details: This card is a 16K addressable RAM board in 4, 8, or 16K blocks. It is designed with the Interface card for extended memory addressing up to 128K bytes (use up to 8 RAM boards), multifunction 8-position switch pack for enabling and disabling Bally memory areas, and on-board clock select.

All printed circuit boards are of the highest quality, with plated-thru hole integrity throughout. All boards are fully socketed with gold plated sockets, and all connectors and fingers are gold plated.

Prices - all units are assembled and tested. The basic RAM board and System One will be available 1 May

System One	200.
16K board	135.

The remainder of the units will be available 31 May

System Five (w/o RAM)	280.
System Five (+ 16K)	395.
System Ten addition	150.
Keyboard addition	145.
Parallel to Serial board	45.

For Sale: Blue Ram with documentation and software \$125; Cartridges: Clowns/Baseball/Football at \$15 each; Seawolf and Maze at \$12 ea. All in perfect shape. Robert Jaeger, 58 Millay Rd., Morganville, NJ, 07751.

Super Software now offers all Videocades and Arcade units at low discount prices. All 29.95 Videocades are 25. All Arcades (including the new BASIC cartridge) are 25.00. We also offer a full line of programs for the Bally Arcade. For information, write Super Software, 44 Forestbrook Dr. North Plainfield, NJ 07060

SALVAGERS Trade good U-17 (Custom Address) for good U-18 (Custom Data). Also need one-chip ROM (reasonable) Richard Dermody, 8431 Timber Glen, San Antonio, TX 78250

FOR SALE Bally Professional Computer. Almost new, just used a few times. Two controllers. \$250 or best offer. Submit all offers Philip Lowe, 12611 Presnell St, Los Angeles, CA 90066

Complete modification kit for your Arcade- \$8.00; Assembled and tested Kludge, \$10.00 (extra parts needed included with both) Add \$25 for new Data chip- and \$1 for postage and handling. Barry Ellerson 5017 River Rd., Schiller Park, IL, 60176

(story and schematic in next issue)

Bally factory games and accessories - special discount to ARCADIAN subscribers. For free price list, write to SFP, 1064 N. Alta Ave., Dinuba, CA 93618

The following tape (\$7.95 + .50 post) is one of many available from WAVEMAKERS, Box 94801, Schaumburg, IL 60193. Write for their catalog.

PROGRAM TAPE #2

SIDE 1 CLUE - BASED ON THE MILTON BRADLY GAME. YOU INPUT NUMBER OF PLAYERS (DETECTIVES). YOU GET A CHOICE OF TWO ROOMS TO GO TO OR YOU CAN TAKE A CHANCE AND GET IN A ROOM NOT SHOWN. YOU CHOOSE THE WEAPON FROM THE ON-SCREEN LIST. THE COMPUTER TELLS YOU ONE OF THE FOLLOWING, WRONG SUSPECT, WRONG ROOM OR WRONG WEAPON. YOU MUST USE DEDUCTIVE REASONING TO COME UP WITH THE RIGHT COMBINATION AND SOLVE THE CRIME. THERE ARE NO GRAPHICS BUT THIS ADDS UP TO HOURS OF FUN. CAN BE PLAYED BY ANY NUMBER OF PLAYERS.

SIDE 2 FLYING ACE FOR (1) OR (2) PLAYERS THIS GAME PUTS YOU IN THE COCKPIT OF A FIGHTER PLANE CHASING AND SHOOTING AT THE ENEMY. YOU MUST SHOOT THE ENEMY DOWN QUICKLY TO GET THE HIGHEST SCORE. CHALLENGING GAME WHEN PLAYED WITH A GOOD OPPONENT.

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3626 Morrie Dr.
San Jose, CA, 95127

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